LOUDOUN COUNTY, VA
TECHNICAL REVIEW

PROPOSED
CO-LOCATION
by
VERIZON WIRELESS
ON
145' TOWN OF ROUND HILL WATER TANK

CMPT 2007-0012
ZMOD 2007-0010
SPEX 2007-0019

Submitted by:

ATLANTIC TECHNOLOGY CONSULTANTS, INC.
A Member of The Atlantic Group of Companies

ATC PROJECT #: 1025-11

November 2, 2007

EXECUTIVE SUMMARY:

Washington DC SMSA d/b/a Verizon Wireless ("Verizon") of Annapolis Junction, Maryland has submitted an application to Loudoun County requesting a Special Exception, Zoning Modification and Commission Permit to co-locate on an existing 145' single pedestal sphere water tank owned by the Town of Round Hill located east of the Round Hill Elementary School on the east side of Evening Star Drive, approximately one half mile north of Harry Byrd highway (Route 7) at 17144 Evening Star Drive, Round Hill, Virginia.

Verizon Wireless is a FCC licensed telecommunications provider authorized and mandated to provide wireless communications services to the Loudoun County area. Verizon is proposing to install an 8-foot vertical mast with twelve (12) panel antennas on the top of an existing 145-foot water tank thereby increasing the overall height of the structure to approximately 155-foot. The Applicant is proposing the co-location to support service delivery in an area of verifiable lack of coverage in and surrounding the Town of Round Hill.

This report outlines the specific areas of evaluation with respect to this proposal, and this consultant's recommendations regarding Application package as presented. Supporting and clarifying evidence regarding the suitability of the proposed design in meeting the specified coverage goals is also included.

In general, it is the opinion of this consultant that this application conforms to all Federal, State, and County regulations regarding the construction of telecommunications support structures, represents a sound design, and should be considered for approval contingent upon the criteria noted in Section 3.0 "Recommendations" of this document.

George N. Condyles IV

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George N. Condyles, IV
President and COO
Atlantic Technology Consultants, Inc.

1.0 TECHNICAL:

1.1 Siting

The existing 145-foot single pedestal sphere water tank is located on a 0.93-acre parcel owned by the Town of Round Hill. The property is zoned PD-H3 (Planned Development-Housing 3) and located on Tax Map 34 ((30)) Parcel 1-A (Pin# 554-26-6077). The proposed site, located east of the Round Hill Elementary School on the east side of Evening Star Drive, approximately one half mile north of Harry Byrd highway (Route 7), can be accessed from Evening Star Drive and is physically located at coordinates N 39° 08' 40.95" and W 77° 45' 38.28" at a ground elevation of 591-feet.

Verizon is proposing to install an 8-foot pod extension to the top of the existing 145-foot water tank and attaching a twelve (12) panel antenna array to the pod. Six (6) antenna panels will measure 47.4" x 4.1" x 5.9" (L x W x D) and six (6) antenna panels will measure 94.5" x 5.5" x 13.2". In addition, an unmanned equipment shelter measuring approximately 12' x 30' x 10' taking up approximately 360 square feet is being proposed. The proposed coax feedline cable would be routed down the interior access tube located inside of the water tank.

Setback:

The Applicant has submitted a Zoning Modification of Article 520.4.1 of the 1972 Ordinance to increase the height of the existing non-conforming water tank to accommodate the proposed mast and antennas. The existing water tank is non-conforming because it exceeds its setback from the property lines by a distance that is equal to the height of the structure (Subject to 1972 Zoning Ordinance), 145-feet. The County approved a subdivision waiver (SBWV 2004-0005) on May 27, 2005 that resulted in the water tank being in violation of the required 145' setback from all property lines (front setback: 113'; rear: 22'; sides: 61'; and 66'), thereby making the water tank a non-conforming structure. The addition of the pod and antennas would increase the total of the structure to 155', thus increasing the degree of non-conformity, which violates Article 804.a of the 1972 Ordinance.

Geotechnical:

Not required

Landscape Buffer:

According to the County Staff Report for the Planning Commission Public Hearing dated October 15, 2007 on page 11, paragraph 2:

"A landscape buffer is currently in place around the perimeter of the site to screen views of the lower portion of the water tank and associated ground equipment. The existing buffer consists of a 6-foot tall chain link fence and a mix of evergreen and deciduous canopy trees, understory trees, and shrubs. The Applicant proposes to supplement the existing buffer with 24 evergreen trees and 8 understory trees and to replace the chain link fence with a green slatted fence to achieve 95 percent opacity. The presence of the Round Hill HOA park area and the existing wooded area to the east of the site, beyond the HOA park area will also help minimize the larger visual impact of the proposed facility on the surrounding area."

Co-Location:

Co-location is preferable to construction of a new site, with such co-location minimizing visual impact of telecommunications equipment on the surrounding area. The nearest existing potential co-location structure already supporting one co-location, Cellular One, is the Purcellville Water Tank located approximately 4 miles east of the Round Hill Water Tank.

In their search for potential candidates for co-location Verizon chose the Round Hill Water Tank, because "The other alternatives were not acceptable because they either did not have an existing structure with the height necessary for signal propagation or would require the construction of a new tower or monopole."

The proposed pod mount will be designed to be extended up to a maximum height extension of 25' above the top of the water tank to allow additional co-location. A structural analysis on the water tank was performed to determine if the water tower can structurally support Verizon's proposed antennas and associated appurtenances, as well as, three (3) additional future co-locations around the belly of the tank. To secure the antennas and cables, welding is the design engineers choice and therefore will require the tank to be drained. In addition, the cables will have to be mounted outside of the tank. The cables will be located in a cable tray attached to the side of the tank. These cables are black in color, and can be painted, but because of freeze/thaw, keeping paint on them will be difficult. See next section of this document, 1.2 "Structural".

1.2 Structural

A Water Tank Structural Analysis dated March 12, 2007 was performed by Morris & Ritchie Associates, Inc. (MRA) and signed/sealed by a professional engineer licensed in the Commonwealth of Virginia. As mentioned in the previous section of this document, the purpose of the structural analysis was to determine if the water tower can structurally support Verizon's proposed antennas and associated appurtenances, as well as, three (3) additional future co-locations. MRA's "…analysis evaluated the tower under the following conditions:

IBC 2003- 90 mph Wind Force + No Ice (3 second gust)
IBC 2003- 90 mph Wind Force + ½ " Ice (3 second gust)
(w/ 25% reduction wind load = 78 mph wind speed)
(Wind direction factors +/- Normal, 60 and 90 degrees to face of the structure)".

MRA concluded that the water tank could structurally accommodate the addition of Verizon's pod mount, antennas, and associated appurtenances, as well as, three (3) additional similar co-locations.

However, there are logistical problems to adding this many co-locations to the water tank as follows (See County Staff Report for Planning Commission Public Hearing dated October 15, 2007, page A-28/A-29):

- "One (1) of the carriers will have to mount directly to the top of the tank. In order to install antennas directly to the tank, mounts will need to be welded directly to the tank which in turn could cause damage to the interior coating of the tank as well as the exterior coating. Also, the tank will need to be emptied while any welding is in progress to insure that the water in the tank is not contaminated by the welding and any necessary repairs to the tank can be completed.
- Because of OSHA regulations for minimum clearness for access, the coaxial cable cannot be stacked in the access tube. With Verizon Wireless' coaxial cable being run through the access tube, it will be possible to run one (1) additional carrier's coaxial cable through the access tube. The coaxial cable for additional carriers must be run on the outside of the tank, but that will also require welding to the tank…"
- In order for a future carrier to run coaxial cables up the access tank, additional penetrations must be made at the base of the tank, and at each platform. Verizon Wireless is showing their coaxial cable coming through the top of the doorway.
- Four (4) carriers, and two (2) sets of coax running up the exterior of the tank will increase the visual impact of the tank…"

Furthermore, in conformance with County ordinance, work at this site will remain in compliance with ALL federal, state, and local building codes and regulations if work proceeds as outlined in the application.

1.3 RF Exposure

FCC bulletin OET-65 provides guidance for a licensee proposing to construct a telecommunications support structure in calculation of RF exposure limitations, including analysis of the cumulative effect of all transmitters on the structure. Appropriate steps, including warning signage at the site, must be taken to protect both the general public and site workers from unsafe RF exposure in accordance with federal guidelines.

Documentation of an RF exposure study is NOT included with this application; therefore it is assumed that this study has not been performed. Although this Consultant sees no evidence of unsafe RF exposure levels being generated at this site if co-location were to proceed as proposed, a certified RF Analysis Report is recommended.

In addition, a procedure with contact names and numbers shall be prepared for situations that may require the antennas to be turned off for maintenance on the tower, etc.

RF site exposure warning signage placement shall be appropriately planned for this site.

1.4 Grounding

Grounding of all structures and equipment at an RF site is critically important to the safety of both personnel and equipment at the site. Even a single component not meeting this standard places all other site components at risk for substantial damage. All structures and equipment at the site should maintain a ground potential difference of less than 5 ohms.

A grounding plan was NOT submitted with this Application.

1.5 General Safety

The existing 0.93-acre parcel is surrounded by a 6-foot tall chain link fence. As previously mentioned in Section 1.1 Siting, “Landscape Buffer”, as per the County, the Applicant proposes to replace the chain link fence with a green slatted fence. The material and height of the green slatted fence is unknown. This Consultant recommends a 6-foot tall (minimum) wood fence. A suitable security fence will prevent unauthorized access to the tower and ground equipment.

Additional safety measures to be placed at this site include RF exposure warning signage, site identification information, and routine and emergency contact information and FCC Registration number.

The Permit Plans should include the installation of an OSHA-approved style of fall prevention cable.

1.6 Interference

An interference study, taking into account all proximally located transmitters and receivers known to be active in the area are advisable prior to any co-location construction. A full interference study has not been included with the Applicant's design, and therefore it is assumed that such a study has not been performed.

While it remains technically prudent and advisable to complete this study for any co-location construction, practically speaking this consultant sees no evidence of interference by or with this site after a general evaluation of the surrounding transmitter sites.

Should any interference issues be posed with respect to this site, mitigation would nevertheless remain the responsibility of the co-locater and affected carrier(s), and would be regulated by the Federal Communication Commission, having no effect or burden on the County.

2.0 PROCEDUREAL

2.1 FAA Study

An initial search was performed by this consultant via TOWAIR Determination under the ASR online system on the FCC website to determine if registration is required. The TOWAIR determination results were as follows:

"Structure does not require registration. There are no airports within 8 kilometers (5 miles) of the coordinates you provided."

2.2 FCC Antenna Site Registration

This site does not yet have, nor is it required to have, an antenna site registration number. For both routine and emergency identification purposes, however, it is recommended that this site be registered with the Federal Communication Commission. All registered sites should have their registration number conspicuously displayed at the site which is normally on the security fence surrounding the compound area.

2.3 Environmental Impacts

The National Environmental Policy Act of 1969 (NEPA), delineated in Title 47 of the Code of Federal Regulations, Part 1, Subpart I, sections 1.1301-1.1319, requires federal agencies to incorporate environmental considerations into their decision-making process when evaluating new construction proposals. As a licensing agency, the Federal Communication Commission (FCC) requires all licensees to consider the potential environmental effects from their construction of antenna support structures, and to disclose those effects in an Environmental Assessment (EA) that must be filed with the FCC for review.

A NEPA Phase I Report should include the following items:

- NEPA Checklist
- NEPA Summary Report
- Associated documentation
    - Figures, Drawings, Maps
    - Tribal Correspondence
    - Land Resources Map and FEMA Floodplain Map
    - SHPO Correspondence (See next Section 2.4 "Historic Impacts)
    - Department of Game and Inland Fisheries Response
    - Department of Conservation and Recreation Response

The NEPA Phase I Assessment is a report that is submitted to the FCC only if requested by the FCC. Otherwise, it shall be reviewed by the appropriate locality for which the proposed tower site is being considered for approval.

A NEPA Phase I Report is not required for this Application.

2.4 Historic Impacts

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires that State Historic Preservation Offices (SHPO) and the President's Advisory Council on Historic Preservation be given a reasonable opportunity to comment on all undertakings with the potential to affect historic properties. The licensee is required to submit to the SHPO a detailed description of the project, a listing of local historic resources, and a discussion of any measures being undertaken to mitigate impacts (if any) on historic resources. Upon receipt, the SHPO has thirty (30) days to review and respond to those submissions. All agencies with authority to permit construction are required to consider the SHPO response in its decision making process with respect to new construction applications.

Upon review of the Nationwide Programmatic Agreement for the Collocation of Wireless Antennas, V. Collocation of Antennas on Buildings and Non-Tower Structures Outside of Historic Districts, it appears that Verizon's proposed co-location on the existing Round Hill Water Tank is exempt from the consultation process.

2.5 Supporting Documentation

Verizon did include documentation supporting the co-location of their antennas on the water tank in the form of propagation mapping.

An independent RF analysis has been performed by this consultant, with a coverage map appended to this report, verifying that the applicant will be able to meet their stated coverage objectives to provide the wireless coverage necessary to alleviate the lack of coverage encountered in this area.

Supporting documentation in the form of photo-simulation was submitted with the Application. This Consultant believes the photo-sims are an accurate representation of the water tower with the 8-foot pod mount and 12-panel antenna array atop from various locations surrounding the proposed site.

2.6 Logistical Issues

- Setback – Each time there is a request that proposes increasing the height of the water tower structure such as Verizon's proposal, it requires a Zoning Modification Request. The Round Hill Water Tank is currently labeled a non-conforming structure and any increase in height would increase its degree of non-conformity.
- Structural – Any co-locations beyond two (2) could not run their coaxial cable down the interior access tube. It would have be to run on the exterior of the water tank , thus increasing the visual impact. In addition, any co-locations beyond two (2) would require the mounts and the cable to be welded directly to the tank, thereby increasing the risk for damage to the interior and exterior coating of the tank and requiring the tank to be emptied while welding is performed.
- Co-location Lease – The Town of Round Hill will only sign a four (4) year and eleven (11) month lease, which is a very short lease term that is virtually unheard of in the industry. This lease term would significantly diminish any carrier's desires to co-locate on the water tank.

3.0 RECOMMENDATIONS

This application represents an appreciable intent on the part of the Applicant to conform to all applicable federal, state, and local regulations, accepted industry practices, and specific County ordinances regarding construction of new telecommunications towers. It is therefore the recommendation of this Consultant that the County consider the Applicant's proposal contingent upon the following criteria being submitted for review prior to final approval:

- Grounding specifications;
- Fence detail;
- Certified RF Analysis Report;
- A procedure with contact names and numbers are submitted for situations that may require the antennas to be turned off for maintenance on the tower

As previously mentioned zoning modification approval is required for overall approval of the application.

In addition, due to potential structural damage and visual impact issues, it is the opinion of this Consultant that Loudoun County only gives consideration to two (2) co-locations total for the Round Hill Water Tank. In other words, if Verizon's proposal to co-locate on the water tank is approved, then only one (1) more (future) co-location application should be considered.

Review the picture titled" Blacksburg Water Tank". This view should be taken into consideration if more than the two co-locators on the top.

In closing, this consultant remains available to address any comments or questions which may arise after review of this report. Any interested party with such comments or questions may feel free to contact this firm, which remains committed to delivering independent, objective, unbiased, and thorough consulting services.

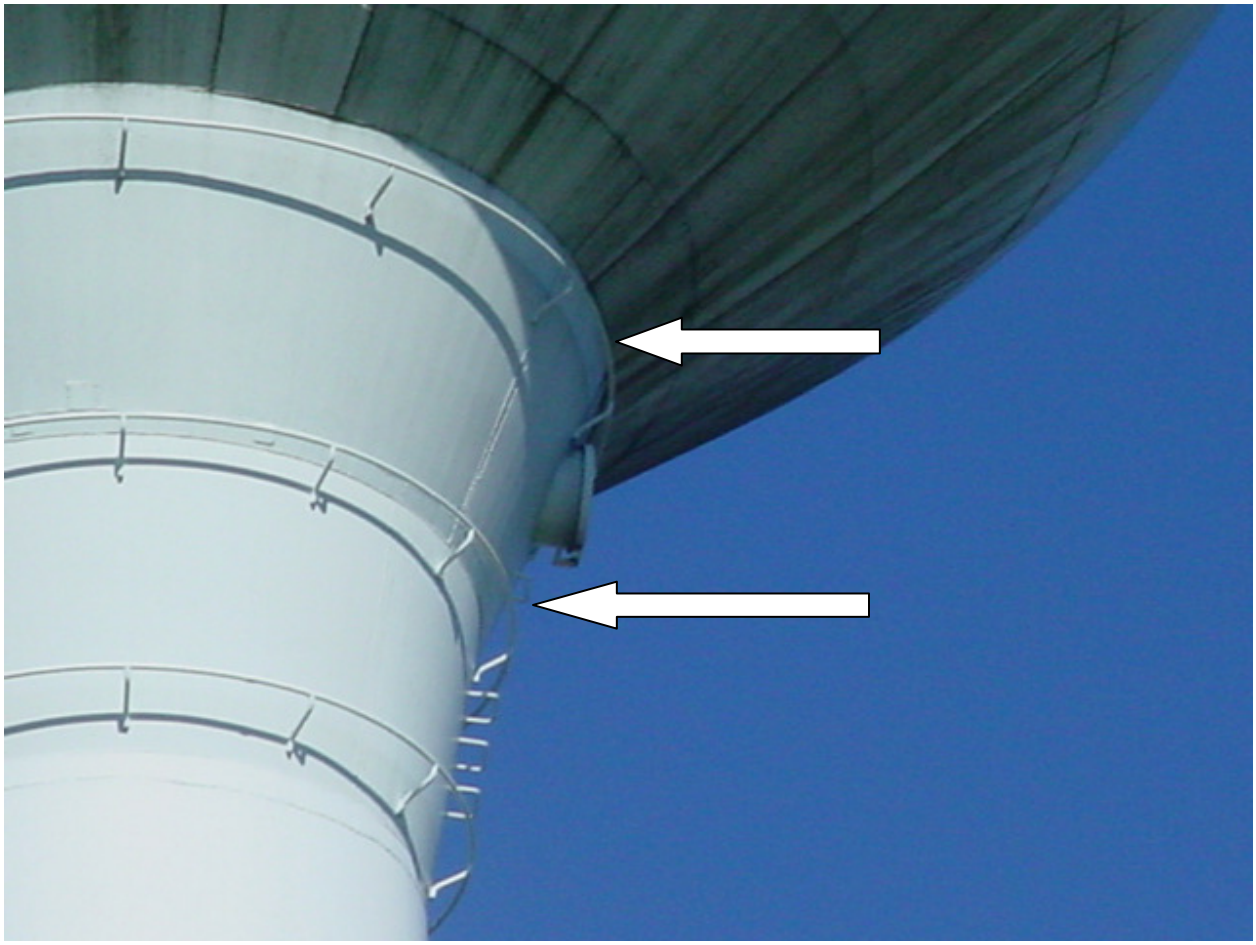
Respectfully submitted,

George N. Condyles IV

George N. Condyles, IV
President & COO

Round Hill Water Tank and Compound

Proposed Location of Verizon Mask Extension Approximate AGL of 155'



Antenna Mounting Rings around “Belly” of the tank.

Water Tank with proximity to school

Blacksburg Water Tank

Similar designed water tank on North Main Street in Blacksburg Virginia

Notice multiple 2" cables for co-locators for exterior Mounting.

Cables can be painted, but becomes a continuing maintenance problem. Notice Blue paint that chipped off due to freeze/thaw action.

View from neighborhood

View from neighborhood

Antenna Structure Registration

TOWAIR Determination Results

HELP

New Search Printable Page

*** NOTICE ***

TOWAIR's findings are not definitive or binding, and we cannot guarantee that the data in TOWAIR are fully current and accurate. In some instances, TOWAIR may yield results that differ from application of the criteria set out in 47 C.F.R. Section 17.7 and 14 C.F.R. Section 77.13. A positive finding by TOWAIR recommending notification should be given considerable weight. On the other hand, a finding by TOWAIR recommending either for or against notification is not conclusive. It is the responsibility of each ASR participant to exercise due diligence to determine if it must coordinate its structure with the FAA. TOWAIR is only one tool designed to assist ASR participants in exercising this due diligence, and further investigation may be necessary to determine if FAA coordination is appropriate.

DETERMINATION Results

Structure does not require registration. There are no airports within 8 kilometers (5 miles) of the coordinates you provided.

Your Specifications

NAD83 Coordinates	
Latitude	39-08-40.9 north
Longitude	077-45-38.3 west
Measurements (Meters)	
Overall Structure Height (AGL)	47.2
Support Structure Height (AGL)	44.2
Site Elevation (AMSL)	180.1

Structure Type

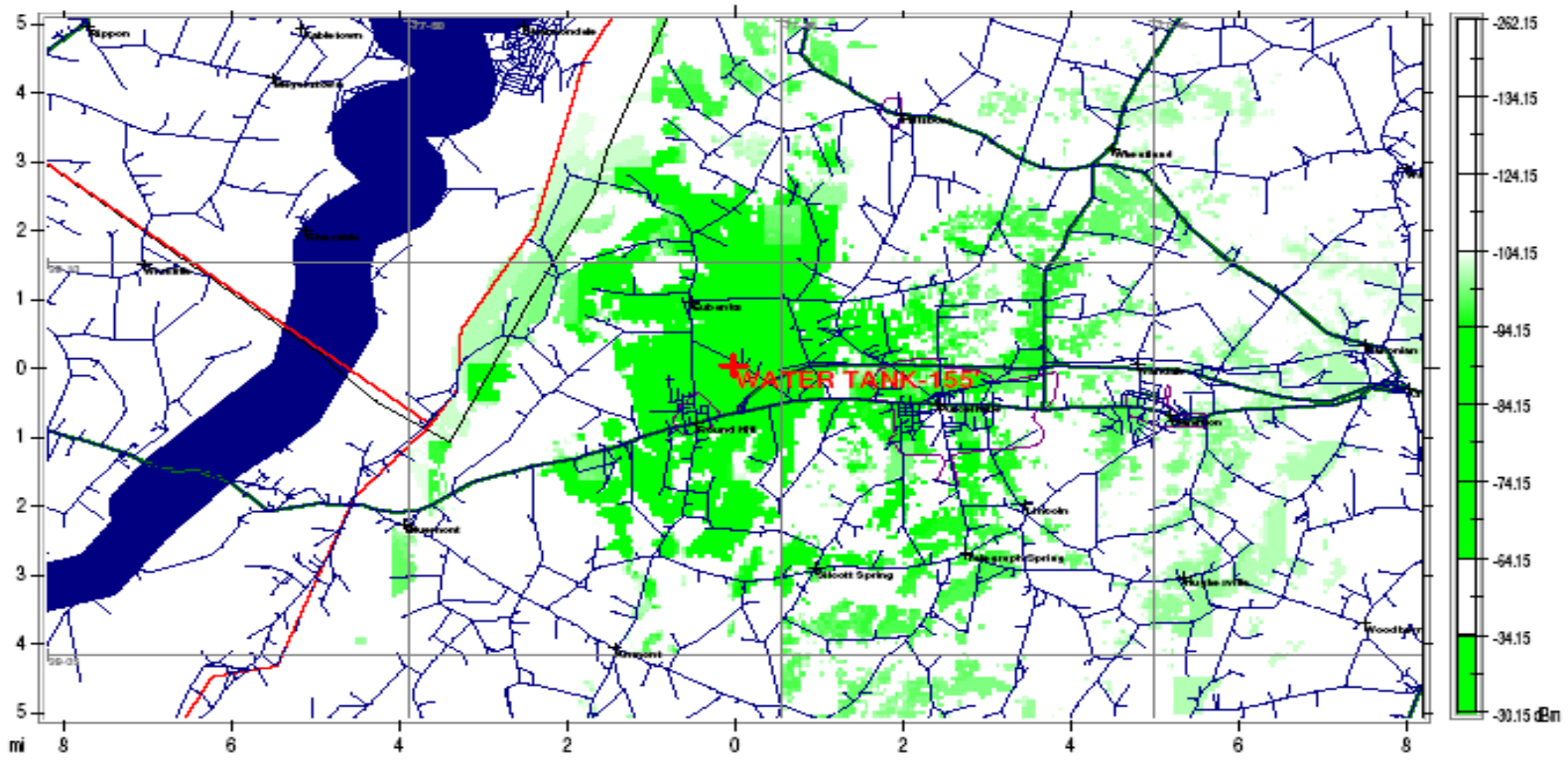
TOWER - Free standing or Guyed Structure used for Communications Purposes

Tower Construction Notification
Notify Tribes and Historic Preservation Officers of your plans to build a tower.
Note: Notification does NOT replace Section 106 Consultation.

Federal Communications Commission
445 12th Street SW

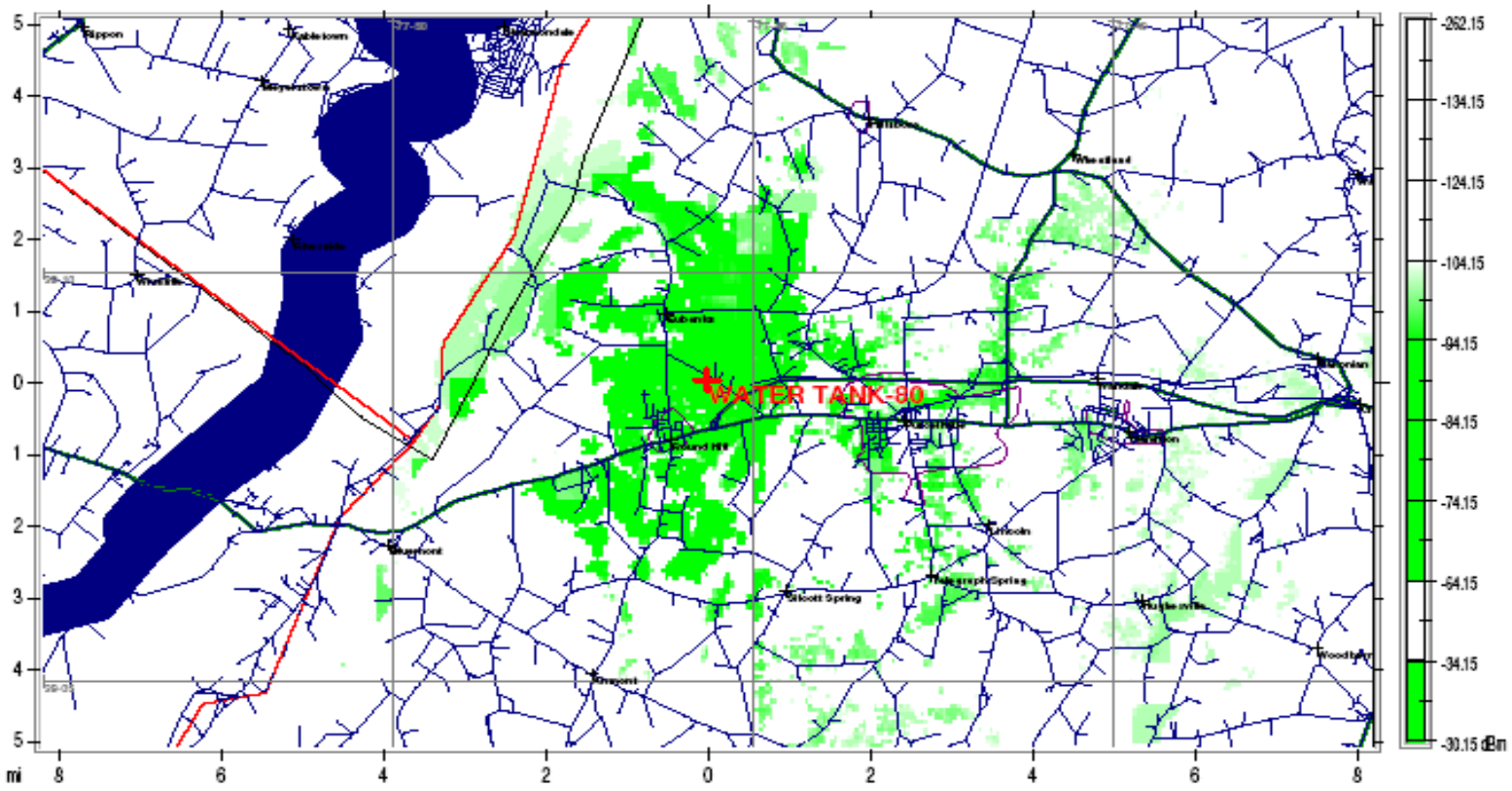
Phone: 1-877-480-3201
TTY: 1-717-338-2824

ROUND HILL, LOUDOUN COUNTY, VIRGINIA



WATER TANK - 155'

ROUND HILL, LOUDOUN COUNTY, VIRGINIA



WATER TANK - 80'